

O-LEACH: The Problem of Orphan Nodes in the LEACH of Routing Protocol for Wireless Sensor Networks

Authors : Wassim Jerbi, Abderrahmen Guerhazi, Hafedh Trabelsi

Abstract : The optimum use of coverage in wireless sensor networks (WSNs) is very important. LEACH protocol called Low Energy Adaptive Clustering Hierarchy, presents a hierarchical clustering algorithm for wireless sensor networks. LEACH is a protocol that allows the formation of distributed cluster. In each cluster, LEACH randomly selects some sensor nodes called cluster heads (CHs). The selection of CHs is made with a probabilistic calculation. It is supposed that each non-CH node joins a cluster and becomes a cluster member. Nevertheless, some CHs can be concentrated in a specific part of the network. Thus, several sensor nodes cannot reach any CH. to solve this problem. We created an O-LEACH Orphan nodes protocol, its role is to reduce the sensor nodes which do not belong the cluster. The cluster member called Gateway receives messages from neighboring orphan nodes. The gateway informs CH having the neighboring nodes that not belong to any group. However, Gateway called (CH') attaches the orphaned nodes to the cluster and then collected the data. O-Leach enables the formation of a new method of cluster, leads to a long life and minimal energy consumption. Orphan nodes possess enough energy and seeks to be covered by the network. The principal novel contribution of the proposed work is O-LEACH protocol which provides coverage of the whole network with a minimum number of orphaned nodes and has a very high connectivity rates. As a result, the WSN application receives data from the entire network including orphan nodes. The proper functioning of the Application requires, therefore, management of intelligent resources present within each the network sensor. The simulation results show that O-LEACH performs better than LEACH in terms of coverage, connectivity rate, energy and scalability.

Keywords : WSNs; routing; LEACH; O-LEACH; Orphan nodes; sub-cluster; gateway; CH'

Conference Title : ICCIT 2016 : International Conference on Computing and Information Technology

Conference Location : Zurich, Switzerland

Conference Dates : January 12-13, 2016